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To test the truth of this, we find $d\theta = p \cos L\,dL$, hence

$$-\frac{dy}{dx} = \frac{-p \cot L \cos \theta \cos L + \operatorname{cosec}^2 L \sin \theta}{-\cot^2 L + p \cot L \sin \theta \cos L + \operatorname{cosec}^2 L \cos \theta}.$$

Putting this expression equal to $\tan \theta$, we deduce

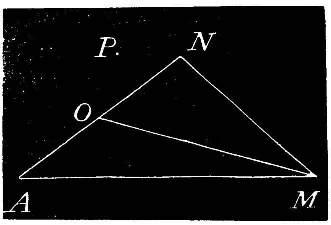
$$p \cos L \sin^2 \theta - \cot L \sin \theta = -p \cos L \cos^2 \theta,$$

or $$p \cos L = \cot L \sin \theta,$$

that is $$\sin \theta = p \sin L.$$

But this is not true, since $\theta = p \sin L$; therefore the meridians and parallels do not generally intersect at right angles. The result indicates however that when θ is small, that is, when either p or L is small, there is a close approximation to perpendicularity. There is also a close approximation when L is near to 90°.

Note on the Solution of Prob. 78, by Dr. H. Eggers.—The published solution of problem 78, short as it is, seems to be rather artificial. The necessity of introducing into the solution the parallelogram equivalent to one-half the triangle does not appear. I beg to present here an other solution, founded on principles of modern geometry.



Let ANM be the given triangle and MO the bisecting line from M, if P is situate within the angle AMN. From this it is evident that the required bisecting line through P will pass between O and N, and between A and M. The required line therefore has to cut from the given angle NAM a triangle of equal area with triangle AOM. Any other bisecting line, not passing through P, will cut on AN and AM respectively two distances x and y, reckoning from A, so that the rectangle xy is constant and will mark on AN and AM two series of homographic points. Drawing from P lines to every pair of corresponding points we shall have two homographic pencils of rays with the common center P. The two coincident rays of the two pencils will be the required bisecting lines. The homography of the two series of points is determined by three pairs of corresponding points, that is, to the points A, O, ∞ on line AN correspond the points ∞, M, A on line AM. Therefore the two pencils are $P(A, O, \infty)$ and $P(\infty, M, A)$. Construct now the two coincident rays according to Steiner's method by means of an arbitrary circle through P; these will solve our problem. For the characteristic property of the double ray is, that the two corresponding points which it marks on AM and AN, and point P are on one line.—The same Solution applies when P is within the triangle, or, at an infinite distance.